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COMPLEMENTARITY OR SUBSTITUTABILITY BETWEEN OUTWARD FDI AND EXPORTING IN INFLUENCING ECONOMIC GROWTH: THE BRICS COUNTRIES ANALYSIS

ABSTRACT

The rise in outward foreign direct investment (OFDI) from developing countries has reignited the debates on its impact on domestic economies. However, there is lack of consensus on the complementary role of OFDI and exports in influencing economic growth. This article investigates whether OFDI and exports have a complementary relationship in affecting economic growth in the BRICS group of countries. For this purpose, the Pooled Mean Group (PMG) ARDL model – as developed by Pesaran *et al.* (1999) has been used to estimate the long-run and short-run relationship between the variables. The findings show that OFDI negatively affects economic growth, while exports positively impact economic growth in BRICS countries. Furthermore, the results also indicate that there is a complementarity relationship between OFDI and exports that promotes economic growth as indicated by a positive and significant interaction term between the variables. Policy implications and recommendations are outlined.

Keywords: Complementarity; Substitutability; Outward FDI; Exports; Economic Growth; BRICS

JEL Classification: C01; C23; F21; F23

RIASSUNTO

Complementarità o sostituibilità tra gli investimenti diretti esteri in uscita e le esportazioni nei confronti della crescita economica: un'analisi dei paesi BRICS

L'aumento degli investimenti diretti esteri in uscita (OFDI) da parte dei paesi in via di sviluppo ha riaperto il dibattito sull'impatto che questi hanno sull'economia dei paesi interessati. Permane comunque una mancanza di consenso sulla complementarità di questi investimenti e le esportazioni nei confronti della crescita economica. Questo articolo esamina se tra gli OFDI e

le esportazioni vi è una relazione di complementarità nell'influenzare la crescita economica nei BRICS. A questo fine, è stato utilizzato il modello di Pesaran *et al.* (1999) – Pooled Mean Group (PMG) ARDL model – per stimare la relazione di breve e lungo periodo tra queste variabili. I risultati indicano che gli ODFI influenzano negativamente la crescita mentre le esportazioni hanno un effetto positivo su di essa nei paesi BRICS. Inoltre, dai risultati si evince che c'è una relazione di complementarità tra gli ODFI e le esportazioni che promuovono la crescita economica, come indicato da un termine di interazione positivo e significativo tra le variabili. Al riguardo si danno suggerimenti e raccomandazioni di policy.

1. INTRODUCTION

The rise in outward foreign direct investment (ODFI) from developing countries has reignited debates about the impact of ODFI on the domestic economies of the investors (see Andreff, 2016; Mohanty and Sethi, 2019; Cielik and Tran, 2019). Opponents of ODFI argue that it may adversely affect a domestic economy by limiting the availability of funds for investment purposes, which in turn raises interest rates and lowers domestic investments (Stevens and Lipsey, 1992). Furthermore, ODFI reduces domestic output and employment as domestic production is substituted by foreign production. According to Cave (1996), ODFI is encouraged by the same forces that limit exports, implying that ODFI is a substitute for exporting. Bouras and Raggad (2015) contend that in the case of recipient countries, generally, foreign short-term investments tend to boost imports while plummeting exports in the longer term. On the opposite of the spectrum, proponents of ODFI point to its advantages such as lowering import costs for intermediate goods, productivity improvements of the investing firms, and technological spillovers to local firms (Herzer, 2012). In the same vein, Fontagne (1999) claims that each dollar invested abroad produces approximately two dollars of additional exports.

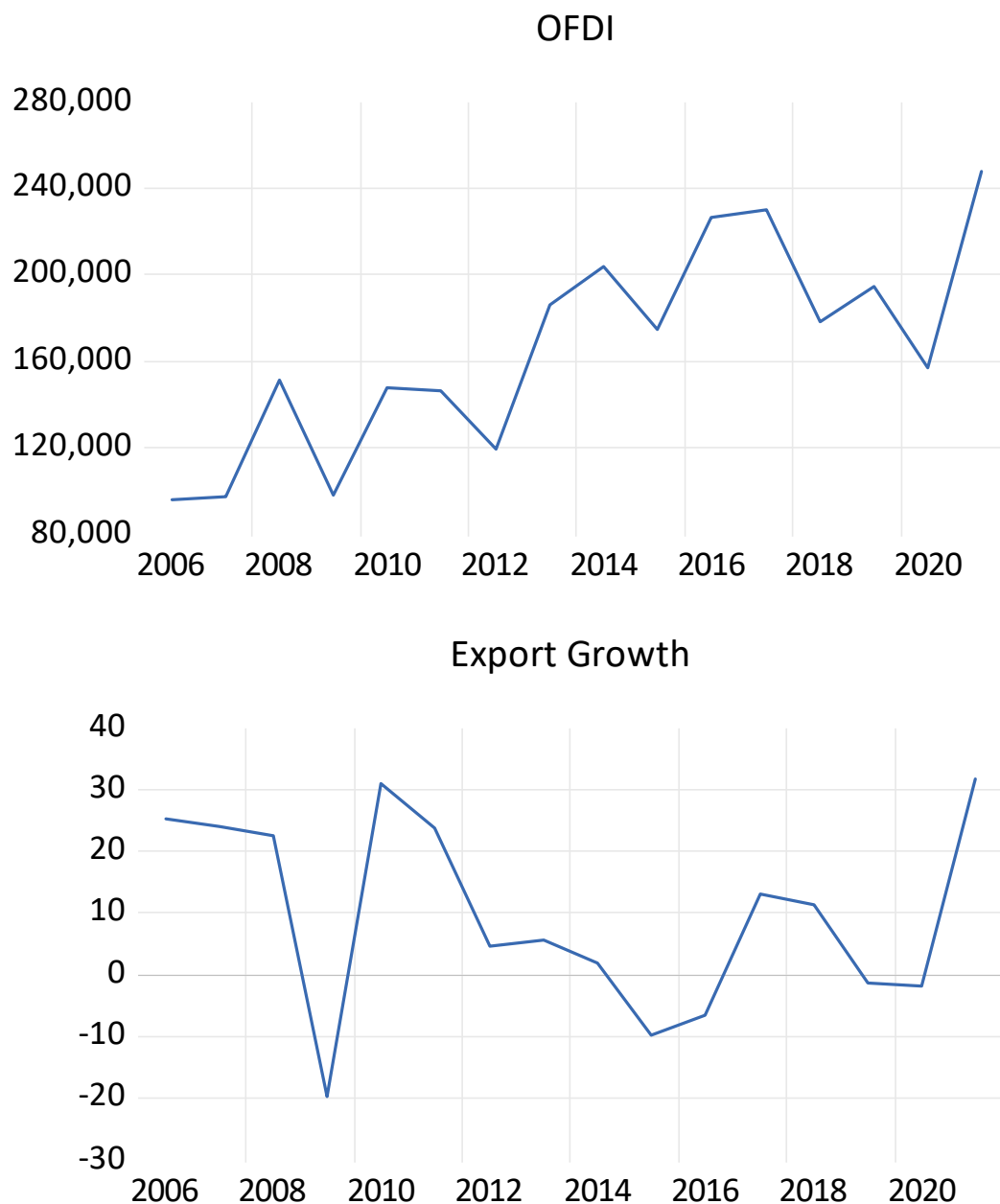
Based on the arguments above, there is no consensus on whether ODFI and exports have a complementary relationship in influencing economic growth. Hence, the rationale to investigate the phenomenon in the case of the BRICS group of countries. The objective of the study is to investigate the complementarity between the ODFI and exporting in influencing economic growth in BRICS. Specifically, the study seeks to investigate whether the impact of ODFI on economic growth is dependent on exports. The study employs the Pooled Mean Group (PMG) technique developed by Pesaran *et al.* (1999) to test the long-run and short-run relationship

between OFDI, exports, and economic growth. The PMG technique was chosen because of its suitability for handling the study's data set and objectives. This method can estimate models that include both $I(0)$ and $I(1)$ variables, and it can also deal with the problems associated with limited sample sizes. As Pesaran *et al.* (1999) for PMG and Pesaran and Smith (1995) for the mean group (MG) explain, an additional benefit is its capacity to capture the dynamics of the variables of interest both in the short and long run. The coefficients from all the cross-sectional units are gathered and averaged to create the PMG estimate. The short-run effects are allowed to vary by country across panels, whereas the long-run effects are permitted to be bound to be equal across all panels. On the other hand, the MG entails estimating each unit and computing the coefficient as the invariant means of the coefficient. The PMG approach also permits heterogeneous coefficients that change over the short and long terms. The PMG is the most appropriate method as the MG requires large time-series observations, even though both methods use the ARDL framework. Furthermore, the PMG is robust to cross-sectional dependence compared to the MG technique (Henningsen and Henningsen, 2019).

The selection of BRICS countries is even more intriguing because Brazil, Russia, India, and China, together known as BRIC since Jim O'Neill coined the name in 2001, have seen astounding growth rates and have taken on a more and bigger role in the global economy (Salisu *et al.*, 2021; Kubendran, 2020). Furthermore, BRICS countries account for 23% of global GDP and 42% of the world's population. BRICS countries contribute significantly to both OFDI and exports in the world economy. BRICS countries export more goods and services and have relatively high OFDI levels in their regions and worldwide compared to other developing countries (Rani and Kumar, 2018; Andreff, 2016; Regissahui, 2019; Bhasin and Kapoor, 2020; Goldar *et al.*, 2020). For instance, in 2019, among the BRICS countries China was the number one exporter in the world, followed by Russia (13th), India (15th), Brazil (25th), and South Africa (36th) (Goldar *et al.*, 2020). According to Andreff (2016), referring to OFDI stock in 2012, Brazil, Russia, India, and China were important sources of OFDI worldwide, where they hold the world positions of 18th, 23rd, 15th, and 12th, respectively. South Africa is an important source of OFDI from the African continent. The country accounted for over 58% (US\$3.1 billion out of US\$5.3 billion) of total OFDI in Africa in 2019 (UNCTAD, 2020). Furthermore, figure 1 based on data from UNCTAD, shows that OFDI in BRICS countries has been on an upward trajectory since 2006 whilst export growth slowed significantly especially during the period between 2012 and 2020. Therefore, the

slowdown in export growth coupled with a rise in OFDI could negatively impact on economic growth and development in BRICS countries.

FIGURE 1 - *OFDI and Export Growth in BRICS Countries*



Source: UNCTAD.

In the empirical economics literature, there has been extensive research on the more general topic of how trade openness and foreign direct investment affect economic growth in BRICS grouping (Banday *et al.*, 2021; Popa and Carp, 2013; Prabhakar *et al.*, 2015). There is also sizable empirical evidence that exports and OFDI individually promote economic growth in the case of BRICS countries (Paul and Mas, 2016; Burange *et al.*, 2019; Banday *et al.*, 2021). However, the available literature has failed to acknowledge the possibility that exports and OFDI may complement or substitute each other in influencing economic growth in BRICS. Studies close to the current study are by Prabhakar *et al.* (2015), and Bhasin and Kapoor (2020). Prabhakar *et al.* (2015) paid attention to the role of FDI inflows and trade on economic growth in BRICS. Bhasin and Kapoor (2020) examine whether there is a complementary or substitutive relationship between exports and OFDI in BRICS economies. However, Bhasin and Kapoor's (2020) scope of the study did not examine the impact of the interaction between exports and OFDI on economic growth. Deferent from these studies, the current study focuses on the possibility of complementarity and substitutability between OFDI and exports in promoting economic growth in the context of BRICS countries. The effect of OFDI on domestic exports deserves consideration since it is crucial to know if production performed overseas will replace domestic exports or work in tandem with them. The balance of payments of an economy will suffer if OFDI substitutes for exports from the home country since there will be a net outflow of resources and money. It is implied by this that the economy would not gain from any potential rise in demand that may have occurred if their MNEs abroad obtained their inputs from the nation of origin. However, if OFDI is a useful addition to domestic exports, it will increase exports through forward and backward connections with domestic companies. In turn, this would help the economy by generating foreign currency, encouraging local investment, and accelerating economic growth. The findings are still contradictory since there is no agreement on how OFDI and exports are related.

This study intends to contribute to the literature on the FDI outflows, exports, and economic growth on BRICS and it can be used as a reference for other emerging economies as well. It is imperative to investigate the kind of relationship between exports and OFDI in promoting economic growth for BRICS economies in order to shed the light on whether economic growth in BRICS countries results from a complementary relationship or not between these variables.

This paper is organised as follows: section two discusses the theoretical and empirical literature.

Section three focuses on data issues and methodology. Section four provides data analysis and empirical results. Section five summarizes the study and discusses policy implications.

2. LITERATURE REVIEW

The question of whether exports and OFDI complement or substitute each other has been a long-standing debate among researchers and policymakers. The Product Life Cycle (PLC) theory of Vernon (1966) argues that a firm would start operating in the international market by exporting, which is less risky and less costly. In terms of this theory, a firm can only consider undertaking OFDI when there is high demand for its exports. In this case, the exports are substitutes for OFDIs (Horizontal FDI). However, Cantwell and Narula (2001) argue that firms may bypass exporting and advance to OFDI; this is known as vertical FDI, which entails Multinational Enterprises (MNEs) exploiting arbitrage opportunities that arise from cost differentiation and factor endowments. In this case, there is a complementary relationship between exporting and OFDI.

In terms of the internalisation theory of Buckley and Casson (1976) and the Ownership, Location, and Internalisation (OLI) paradigm of Dunning (1980), OFDI and exporting are different ways of serving foreign markets. According to Buckley and Casson (1976), an enterprise can internalise costs when its economic operations are more efficient than the market. Furthermore, internalisation theory states that OFDI can be a substitute for exports if internalisation costs (i.e. fixed costs of production) are below exporting costs (i.e. transportation costs, tariffs, taxes, etc.). However, the OLI paradigm sets three conditions for an enterprise to consider FDI as an entry mode, which are ownership (O), location (L), and internalisation (I). If any of these conditions is missing then exporting is a better choice (Dunning and Lundan, 2008). In this case, OFDI and exports are substitutes. The complementarity or substitutability between the two variables can depend also on the developmental status of the country. When an OFDI investment is directed to a developing country one can expect a complementary relationship since the host may not get needed intermediate goods from local suppliers, therefore, they can be imported from the home country. However, a substitute relationship between the variables is expected if the OFDI is directed to a developed country, as the motivation for the OFDI is to expand the market and the operations in a host country are duplicates of the home country.

Empirically, there are limited studies that examined the complementary and substitute effects of OFDI on exports in promoting economic growth in the context of the BRICS grouping. Literature on OFDI consists of studies that investigate the links between OFDI and macroeconomic variables such as growth, investment, and productivity (Lee, 2010; Herzer, 2012; Al-Sadiq, 2013; Bhasin and Paul, 2016; Li *et al.*, 2017; Mohanty and Sethi, 2019). Lee (2010) reported that OFDI Granger causes economic growth in the long run in Japan. Herzer (2012) found that there is bidirectional causality between OFDI and domestic output as well as OFDI and total factor productivity (TFP) in Germany. Li *et al.* (2017) applied data of manufacturing firms from China covering 2002-2008 with information on OFDI and exports to test the relationship between OFDI and factor productivity. The results confirmed the positive relationship between OFDI and TFP in line with the findings of Herzer (2012). Al-Sadiq (2013) reported that OFDI has a negative effect on domestic investments in developing and transition economies. Mohanty and Sethi (2019) used cointegration analysis and found that OFDI has a positive effect on human capital in the short-run and a positive effect on economic growth in both the long-run and short-run in BRICS countries.

A number of studies investigated the relationship between OFDI and exports. For instance, Kim and Rang (1997) examined whether OFDI substitutes or complements exports in South Korea and Japan. In the case of both South Korea and Japan OFDI was not found as a substitute nor a complement to exports. Chow (2012) investigated the effect of OFDI on exports in Taiwan using a gravity model and found that OFDI has complementary effects on exports. In line with the findings of Chow (2012), Xiong and Sun (2021) also found a complementary relationship between OFDI and exports using a gravity model. On the contrary, Bhasin and Paul (2016) examined the relationship between OFDI and exports using panel data for ten emerging economies in Asia covering 1991-2012. Their results generated from panel VAR, panel cointegration, and causality test show the long-run causality from exports to OFDI and not vice versa. Bhasin and Paul (2016) further found a substitute relationship between exports and OFDI, meaning that the MNEs are not linking with the home country firms via backward and forward links in the production process. Tripathy *et al.* (2021) also found evidence of a substitute relationship between OFDI and exports for Indian manufacturing firms using the PMG technique.

A number of studies in BRICS countries are either focused on the contribution of both OFDI and

exports to economic growth separately or examine the relationship between exports and OFDI (Paul and Mas, 2016; Burange *et al.*, 2019; Bhasin and Kapoor, 2020; Banday *et al.*, 2021). Paul and Mas (2016) investigated the factors that contributed to China's and India's trade advancement in the global economy and maintaining high economic growth levels. Their findings show that FDI and exports contribute significantly to their economic growth. Burange *et al.* (2019) examine the causality between trade openness and economic growth in BRICS countries. The findings show the evidence of export-led growth in the case of China; while India's growth is supported by service exports. Bhasin and Kapoor (2020) applied a panel VECM and causality test on data from BRICS economies covering 1993-2015 to investigate the influence of OFDI on home country exports. The findings reveal a substitutive relationship between OFDI and exports in these countries. Banday *et al.* (2021) investigated FDI, trade openness, and gross domestic product causality in BRICS using the ARDL model. They found that trade and FDI have a positive effect on economic growth in the long run.

The surveyed studies either investigate the complementary or substitute relationship between OFDI and exports. There is scant evidence on the complementary effects of OFDI and exports in promoting economic growth which is a gap that this study sought to fill. Investigating the complementarity and/or substitutability between exports and OFDI in influencing economic growth in the BRICS countries is of interest since the BRICS countries are among the top FDI sources and exporters in the world despite being developing countries.

3. DATA AND EMPIRICAL METHODOLOGY

3.1 Data Sources and Variable Description

The study uses the panel data analysis technique to examine the complementarity and substitutability between exports and OFDI in BRICS economies. The panel data cover the period 1990 to 2020. The sample period was selected based on the availability of data. Data for the dependent variable (GDP growth), independent variables (OFDI and Exports), and control variables (inflation, investment as a percentage of GDP, and government consumption expenditure as a percentage of GDP) were accessed from World Bank's World Development Indicators.

3.2 Model Specification and Estimation Procedure

Borrowing from Sghaier and Abida (2013) the current study addresses its main objective by specifying a model with an interaction term as follows:

$$GDP_{it} = \beta_0 + \beta_1 OFDI_{it} + \beta_2 EXP_{it} + \beta_3 (OFDI_{it} \cdot EXP_{it}) + \beta_4 X_{it} + \mu_{it} + \varepsilon_{it} \quad (1)$$

GDP indicates GDP growth rate. β_0 represents the intercept while μ_t stands for a time and unobserved economy-specific effect. $X_{i,t}$ is the vector of control variables at time t for country i and ε_{it} denotes the error term. Dummy variables for period of the global financial crisis of 2008/2009 as well as the COVID-19 pandemic (2020) are also included to capture the effect of those events on economic growth. The data shows that there were major contractions in economic growth for most countries in the sample during those periods. For instance, during the global financial crisis Brazil, Russia and South Africa recorded contractions in GDP growth while during the period of the COVID-19 pandemic in 2020, only China recorded positive economic growth. To see the presence of complementarity between OFDI and exports the study tests for these variables' interaction significance. If the coefficient of the interaction term is positive and significant it implies that OFDI and exports are complementing each other in promoting economic growth.

In line with existing literature, the most important variables that affect economic growth are included in Equation 1. These variables include OFDI, exports (EXP), inflation (INF), investment ratio (INV), and government consumption (GOV). Inflation as a measure of macroeconomic instability is expected to be negatively related to economic growth (Bittencourt, 2012). Government consumption expenditure captures the impact of the public sector on economic growth. The effect of government expenditure on economic growth is ambiguous (Bonfiglioli, 2005). Government expenditure increases aggregate demand, which in turn promotes economic growth as outlined by the Keynesian School of Thought. On the contrary, government expenditures may be growth retarding as high tax rates used to finance expenditures may crowd out investments (Barro, 1990; Onifade *et al.*, 2020). Investments are regarded as one of the main determinants of economic growth (see Solow, 1956).

The PMG technique developed by Pesaran *et al.* (1999) is adopted for the empirical analysis. This technique assumes homogenous long-run coefficients while the short-run coefficients are assumed to be similar for the cross-sectional units. The PMG estimator follows the approach of

the Autoregressive Distributed Lag Model (ARDL) and thus can be used with variables integrated of different orders. More specifically, the technique can be estimated with a combination of variables integrated of order one (I(1)) or stationary in level (I(0)). Other estimation techniques that follow the ARDL framework include the Mean Group (MG) estimator of Pesaran and Smith (1995), and the Dynamic Fixed Effects (DFE). Contrary to the PMG, the MG technique assumes heterogeneous short-run and long-run coefficients, while the DFE follows a similar approach to the PMG estimator (Samargandi *et al.* 2015). The PMG is the most appropriate approach as the MG requires large time-series observations. The Westerlund (2005) cointegration test is employed to test for the presence of cointegration which is a requirement prior to the estimation using the PMG approach. The Westerlund test is based on the null hypothesis of no cointegration and is appropriate for this study due to its ability to cater for cross-sectional dependence which is common in panel data models.

The PMG technique is specified by extending the single time series ARDL framework as follows:

$$GDP_{it} = \sum_{j=1}^p \gamma_i GDP_{i,t-j} + \sum_{j=0}^q X_{i,t-j} \beta_{ij} + \mu_i + \epsilon_{it}, \quad t = 1, 2, \dots, T, \quad i = 1, 2, \dots, N \quad (2)$$

where μ_i represents the fixed effects, X_{it} is a vector of explanatory variables, γ_{ij} and β_{ij} are vectors of parameters.

The error correction form of the above equation is:

$$\Delta GDP_{it} = \phi_i GDP_{i,t-1} + X_{it} \alpha_i + \sum_{j=1}^{p-1} \gamma_{ij}^* \Delta GDP_{i,t-j} + \sum_{j=0}^{q-1} \Delta X_{i,t-j} \beta_{ij} + \mu_i + \epsilon_{it} \quad (3)$$

where:

$$\phi_i = -(1 - \sum_{j=1}^p \gamma_{ij}) \text{ and } \alpha_i = \sum_{j=0}^q \beta_{ij}$$

Panel data analysis is prone to the issue of cross-sectional dependence because of the unobserved common factors (Henningsen and Henningsen, 2019). As such, Pesaran (2004)'s cross-sectional dependence test is used to test for cross-sectional dependence. Cross-sectional dependence renders inappropriate the standard first-generation unit root tests of Levin *et al.* (2002), Im *et al.* (2003), as well as the estimation techniques such as pooled OLS, fixed effects, random effects, and the mean group (MG) estimator (Henningsen and Henningsen, 2019). The

PMG estimator is more robust to the presence of cross-sectional dependence compared to the conventional tests (Lau *et al.*, 2019). The PMG technique follows the ARDL approach which crashes in the presence of variables integrated of order two (I(2)). The study utilises Pesaran's (2007) CIPS unit root test which is a second-generation test based on the assumption of cross-sectional dependence. For robustness checks, the study employed the Feasible Generalised Least Squares (FGLS). The FGLS technique is robust to heteroscedasticity, autocorrelation and cross-sectional dependence across panels (Greene, 2018).

4. EMPIRICAL RESULTS

Table 1 - *Descriptive Statistics*

Variable	Mean	Std. Dev.	Min	Max
GDP	4.719	4.110	-7.252	14.231
GOV	15.809	3.333	9.802	20.928
INF	73.561	373.367	-1.401	2947.733
INV	26.990	10.404	12.746	46.660
OFDI	0.567	0.653	-2.595	2.600
EXP	18.960	6.998	6.73	36.035

GDP growth averages 4.719%. This is largely driven by the high economic growth in China and India. Growth rates in Brazil, Russia and South Africa have been lower especially after the global financial crisis on 2008/2009. China and India also have higher levels of investments compared to the other countries with mean values of 40% and 31% respectively. The mean for the OFDI/GDP ratio is 0.567% while the exports/GDP average 18.960%. Russia and South Africa have higher exports/GDP ratios (31% and 25%, respectively). The standard deviation suggests a great deal of variation in the inflation rate. This variation is largely driven by the high inflation rate in Brazil during the early 1990s. The negative observations of inflation prevent the use of that variable in logarithmic form.

The correlation matrix in Table 2 shows that government spending and inflation have a negative association with GDP while investment is positively correlated with GDP. OFDI and exports are positively correlated with GDP, and the correlations are significant. The correlations between the independent variables are less than 0.8 which is an indication of the absence of severe

multicollinearity. Correlation analysis measures the degree of linear association and thus does not imply causation.

TABLE 2 - *Correlation Matrix*

Variables	GDP	GOV	INF	INV	OFDI	EXP
GDP	1.000					
GOV	-0.531***	1.000				
INF	-0.163*	0.133	1.000			
INV	0.729***	-0.600***	-0.113	1.000		
OFDI	0.129	0.112	-0.115	0.175*	1.000	
EXP	0.211**	-0.028	-0.252***	0.248***	0.224**	1.000

Note: ***, ** and * indicate significance at 1%, 5% and 10% levels respectively.

Table 3 suggests the presence of cross-sectional dependence in the data. The null of cross-sectional independence is rejected at the 1% level for all the variables in the model. As such, the PMG technique is more appropriate for empirical analysis compared to conventional tests such as fixed effects, random effects, pooled OLS, and the MG technique.

TABLE 3 - *Cross-Sectional Dependence*

Variable	CD-test	P-value	Corr	Abs (Corr)
GDP	7.24	0.000	0.531	0.531
GOV	3.31	0.001	0.242	0.242
INF	5.62	0.000	0.412	0.412
INV	5.44	0.000	0.399	0.399
OFDI	3.76	0.000	0.276	0.290
EXP	8.18	0.000	0.600	0.600

Notes: The test was conducted using the xtdc command created by Eberhardt (2011a). Under the null hypothesis of cross-section independence $CD \sim N(0,1)$.

TABLE 4 - *Unit Root Tests*

	Without Trend	With Trend	Without Trend	With Trend
	Level		First difference	
Variable	Zt-bar	Zt-bar	Zt-bar	Zt-bar
GDP	-3.620***	-3.763***		
GOV	-0.663	0.269	-5.226***	-4.431***
INF	-5.022***	-3.686***		
INV	-0.925	-1.159	-7.145***	-6.252***
OFDI	-3.290***	-2.242**		
EXP	0.922	1.486	-3.154***	-2.211**

Note: (***) and (**) indicate significance at 1% and 5% levels respectively. The CIPS test was conducted using the Multipurt command created by Eberhardt (2011b).

Due to the presence of cross-sectional dependence, the CIPS unit root test is used to determine the order of integration of the variables. The results presented in Table 4 show that GDP growth, inflation and OFDI are stationary in level while government spending, investment, and exports are stationary at first difference. The PMG technique is appropriate for the empirical analysis due to the presence of variables integrated of different orders. As shown in Table 5, the Westerlund (2005) cointegration tests suggest the presence of cointegration which is a prerequisite for the estimation by the PMG technique. The null of no cointegration is rejected at the 1% level.

TABLE 5 - *Westerlund Cointegration Tests*

	Statistic	P-value
Variance ratio	3.001	0.0013

Note: The cointegration tests were conducted using the xtcointtest command.

Table 6 shows the regression results of the study. The first column shows the results of the PMG technique and the second column shows the results of the FGLS approach used in this study for robustness checks. The results show that exports have a positive effect on economic growth in line with the theoretical expectations. However, the coefficient is only significant in the FGLS results. A positive coefficient of exports is in line with the export-led growth literature (Hosein *et al.*, 2019). OFDI on its own has a negative impact on economic growth which supports the notion that capital outflows may hinder domestic production and investment. OFDI may also impact negatively on an economy's balance of payments due to the transfer of resources from the domestic economy to foreign economies (Bhasin and Kapoor, 2020). OFDI and exports have a complementary relationship in influencing GDP growth. The coefficient of the interaction term is positive and statistically significant which suggests that OFDI impacts positively on economic growth if complemented with an increase in exports. A complementary relationship between OFDI and exports results from backward and forward linkages in production which contribute to economic growth through increased investments and foreign exchange reserves. The negative effect of OFDI on the balance of payments is offset by a rise in exports through linkages between domestic and foreign producers. Therefore, the rise in OFDI from BRICS economies over the recent past could hinder economic growth if it is not complemented by a rise in exports. The observed slowdown in export growth in BRICS countries (as shown in figure 1) could be detrimental to economic growth given the rise in OFDI. Fostering linkages between domestic and foreign industries is of paramount importance such that an increase in output in foreign industries results in increased demand for domestic inputs. Furthermore, Herzer (2010) and Chen and Zulkifli (2012) suggest that OFDI promotes economic growth through productivity and technological spillovers that boost domestic output and in turn exports.

TABLE 6 - *Regression Results*

Variable	PMG	FGLS (robustness)
GOV	-1.237 (-7.58)***	-0.231 (-1.77)*
INF	-0.001 (-1.05)	-0.001 (-1.45)
INV	-0.080 (-1.28)	0.253 (6.67)***
EXP	0.060 (1.25)	0.103 (2.17)**
OFDI	-2.221 (-1.72)*	-2.492 (-2.55)**
OFDI*EXP	0.096 (1.96)**	0.107 (2.63)***
Short-run		
ECT	-0.748 (-11.30)***	
D.GOV	0.316 (0.72)	
D.INF	0.004 (0.06)	
D.INV	0.661 (2.23)**	
D.OFDI	1.152 (0.65)	
D.EXP	-0.048 (-0.26)	
D.OFDI*EXP	-0.053 (-0.71)	
COVID-19	-5.823 (-4.18)***	-6.965 (-7.63)***
CRISIS	-0.578 (-1.22)	-2.891 (-4.02)***
CONSTANT	0.3036*** (12.45)	-0.244 (-0.09)

Note: ***, ** and * indicate significance at 1%, 5% and 10% levels respectively. The figures in parenthesis are z-statistics.

Government expenditure has a negative effect on economic growth. This is possibly due to the negative effects of higher taxes that are usually correlated with higher levels of government expenditure. Furthermore, the negative coefficient could be an indication of the crowding-out effect of government spending which negatively impacts economic growth. Inflation has a negative but significant effect on economic growth. Surprisingly, investment has an insignificant effect on economic growth in BRICS countries. The error correction term of the PMG is negative and significant which is an indication of model stability and the presence of a long-run relationship between the variables. The short-run coefficients of the PMG are mostly insignificant with the exception of investment which is positive and significant. This supports *a priori* expectations as investment has been one of the drivers of economic growth in countries such as China and India where investment/GDP ratios are in excess of 30%. To a large extent, the results are robust to the change in the estimation technique to the FGLS. The interaction term between OFDI and exports retains the positive and significant coefficient. Government expenditure retains its negative coefficient while inflation also negative and insignificant. Exports have a positive effect on economic growth and the coefficient is significant in the FGLS. Investment is positive and significant which is in line with the short-run coefficient of the PMG. The negative coefficient of OFDI is also evident in the FGLS results. Therefore, it can be concluded that the results are robust to heteroscedasticity, serial correlation and cross-sectional dependence.

5. CONCLUSION AND POLICY RECOMMENDATIONS

This paper investigated the complementarity and substitutability between OFDI and exporting in influencing economic growth in BRICS countries. Using pooled mean group (PMG) technique the findings show that OFDI reduces investments in the domestic economy which in turn has a negative effect on economic growth, while exports have a positive effect on economic growth. We interacted exports and OFDI to examine whether these two determinants of growth are supporting each other or not in promoting economic growth. The results show that OFDI and exports have a complementary relationship in influencing GDP. The coefficient of the interaction term is positive and statistically significant which suggests that OFDI impacts positively on economic growth if complemented with an increase in exports. A complementary relationship between OFDI and exports results from backward and forward linkages in

production which contributes to economic growth through increased investments and foreign exchange reserves.

It is a matter of concern for policymakers as OFDI seemed to have an inverse effect on economic growth. This negative impact could be because of a negative effect of OFDI on the balance of payment position as well as investments and employment. Also, this could be resulting from a lack of linkages between domestic and foreign firms. Therefore, the study recommends that government should design the FDI policy in a manner that fosters linkages between domestic and foreign firms such that an increase in output in foreign industries results in increased demand for domestic inputs. As exports have a positive effect on economic growth, it is recommended that policymakers in BRICS countries incentivise exporting firms to encourage more domestic production. BRICS countries should also implement policies that are conducive to domestic investments in order to reduce OFDI.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in Harvard Dataverse at <https://doi.org/10.7910/DVN/VN5U3E>.

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